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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/748,612

12/30/2003

David Michael Hoffman

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01/12/2006

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EXAMINER

MIDKIFF, ANASTASIA

ART UNIT

PAPER NUMBER

2882

DATE MAILED: 01/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/748,612	Applicant(s) HOFFMAN, DAVID MICHAEL	
	Examiner Anastasia Midkiff	Art Unit 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7,9-19 and 21-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7,9-19 and 21-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments, see Amendment, filed 09 December 2005, with respect to the rejection(s) of claim(s) 1-7, 9-19, and 21-24 under 35 U.S.C. 102(b) and 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of new prior art found during a revised search, and detailed below.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to Claims 4 and 16, Claims recite controlling an x-ray tube focal spot by, "steering an electron beam to illuminate two focal spots on a cathode of an x-ray tube," and "apparatus is configured to steer an electron beam of the x-ray tube to illuminate two different focal spots on a single cathode," respectively, wherein the cathode is emitting an electron beam, and, therefore, must have a focal spot on the anode or other target. This misdescription renders the claim indefinite. For the purpose of examination, examiner assumes that applicant means the focal spots **of** a cathode.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 6, 7, 13, 15, 18, and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent to Brunnett (USP# 6,963,631).

With respect to Claims 1 and 13, Brunnett teaches an apparatus, and a method for scanning an object (Column 3, Lines 19-21) comprising a multi-slice CT imaging system (Column 3, Lines 14-15 and 29-32) in a helical mode (Column 3, Lines 25-28), said system having a plurality of detector arrays (34a, 34b) arranged along a z-axis direction (Column 3, Lines 48-51) configured to detect radiation from source passing through object to be imaged (Column 3, Lines 37-45), a radiation source (14) on a rotating gantry (22, and Column 3, Line 24), said source having a beam focal spot (Column 6, Lines 40-45), said method including controlling a wobble of said focal spot of said source in the z-axis direction during said scanning (Column 6, Lines 40-55) to selectively preferentially illuminate individual said detector arrays through scanned

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object (Column 7 Lines 10-16, and Column 12 Lines 29-40), and a DAS (30) which is collecting data from said detector array for each view only when the array from which data is being collected is selectively illuminated (Column 7 Lines 10-16, and Column 12 Lines 29-59).

With respect to Claims 3, 6, 15, and 18, Brunnett further teaches an apparatus and method for its use, comprising an x-ray tube radiation source (14, and Column 3, Line 17), and that said controlling a wobble of the source focal spot comprises dynamically controlling focal spot of said x-ray tube (Column 6, Lines 40-45).

With respect to Claims 7 and 19, Brunnett further teaches an apparatus and method for its use, wherein said object is a medical patient (Column 3, Lines 19-21), upon a moveable table (20), said table configured to support said patient between radiation source and detector arrays (Figure 1, and Column 3 Lines 22-24).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9, 11, 12, 21, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent to Brunnett in view of U.S. Patent to Gordon (USP# 6,067,342).

With respect to Claims 9 and 21, Brunnett teaches an apparatus, and a method for scanning an object (Column 3, Lines 19-21) comprising a multi-slice CT imaging system (Column 3, Lines 14-15 and 29-32) in a helical mode (Column 3, Lines 25-28), said system having a plurality of detector arrays (34a, 34b) arranged along a z-axis direction (Column 3, Lines 48-51) configured to detect radiation from source passing through object to be imaged (Column 3, Lines 37-45), a radiation source (14) on a rotating gantry (22, and Column 3, Line 24), said source having a beam focal spot (Column 6, Lines 40-45), said method including controlling a wobble of said focal spot of said source in the z-axis direction during said scanning (Column 6, Lines 40-55) to selectively preferentially illuminate individual said detector arrays through scanned object (Column 7 Lines 10-16, and Column 12 Lines 29-40), and a DAS (30) which is collecting data from said detector array for each view only when the array from which data is being collected is selectively illuminated (Column 7 Lines 10-16, and Column 12 Lines 29-59).

Brunnett does not teach a pulsed radiation source, or a method wherein said source is pulsed so that source is off when focal spot is wobbled between positions in which individual detector arrays are selectively illuminated.

Gordon teaches a pulsed radiation source (102) that may operate at the same or different energies, wherein source is pulsed so as to receive two different sets of detector data, as each preferentially illuminated slice (606) of each detector (306) is illuminated (Column 13, Lines 21-34) to provide slice data for 2D reconstruction that

compensates for non-uniformity of the source output by recording only data from the illuminated detector slice(Column 13, Lines 12-20).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the pulsed source of Gordon in the apparatus and method of Brunnett to provide data from the separate arrays of Brunnett that compensates for the spatial non-uniformity of a single x-ray pulse across several detectors.

With respect to Claims 11 and 23, Brunnett further teaches an apparatus and method for its use, comprising an x-ray tube radiation source (14, and Column 3, Line 17), and that said controlling a wobble of the source focal spot comprises dynamically controlling focal spot of said x-ray tube (Column 6, Lines 40-45).

With respect to Claims 12 and 24, Brunnett further teaches an apparatus and method for its use, wherein said object is a medical patient (Column 3, Lines 19-21), upon a moveable table (20), said table configured to support said patient between radiation source and detector arrays (Figure 1, and Column 3 Lines 22-24).

Claims 4 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent to Brunnett, as applied to Claims 3 and 15 above, in view of U.S. Patent to Dunham et al. (USP# 6,980,623).

With respect to Claims 4 and 16, Brunnett teaches the elements of Claims 3 and 15, but does not teach an apparatus or method wherein dynamically controlling the focal spot comprises steering an electron beam to illuminate two focal spots on a cathode of the x-ray tube.

Dunham et al. teaches an apparatus, and method for its use, wherein dynamically controlling a focal spot (246) on an anode (244) of an electron beam emitted by a cathode (238), by steering an electron beam to illuminate two focal spots on said anode of an x-ray tube (Column 6, Lines 43-59) to ensure proper focus of beam for z-tracking in CT imaging involving electron beam wobbling (Column 8, Lines 20-33 and 57-65).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the focal spot control apparatus and method of Dunham et al. in the apparatus and method of Brunnett to achieve precise focal spot positioning along z-axis of detectors, as taught by Dunham et al. (Column 8, Lines 57-65, and Abstract).

Claims 5 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent to Brunnett, as applied to Claims 3 and 15 above, in view of U.S. Patent Application to Block et al. (PGPUB# 2005/0100132).

With respect to Claims 5 and 17, Brunnett teaches the elements of Claims 3 and 15, but does not teach that dynamically controlling the focal spot comprises alternately strobing two cathodes in an x-ray tube to illuminate two focal spots.

Block et al. teaches a method of dynamically controlling a focal spot on an anode assembly (88) of an electron beam emitted by an assembly of cathodes (90), by alternately strobing two cathodes (Figure 8) in an x-ray tube to illuminate two focal spots (Paragraph 39) said x-ray tube operating in a wobble mode (Paragraph 41, Lines 15-18) of a CT imaging system (10), allowing target areas to perform at 50% duty cycle to

extend the life of said target and increase power output without additional increase in anode size or speed (Paragraph 39, Lines 13-22).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the focal spot control method and apparatus of Block et al. in the apparatus of Brunnett to achieve longer target life and greater power without an inefficient, burdensome, and costly increase in target size or speed, as taught by Block et al. (Paragraph 39, Lines 13-22).

Claims 2 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brunnett, as applied to Claims 1 and 13 above, in view of U.S. Patent to Toth et al. (USP# 5,224,136).

With respect to Claims 2 and 14, Brunnett teaches the elements of Claims 1 and 13, but does not teach a method or apparatus wherein controlling a wobble of the source focal spot comprises moving a pre-object collimator.

Toth teaches a method and apparatus wherein controlling a wobble of the source (10) focal spot (26) comprises moving a pre-object collimator (38, Column 13 Lines 29-45, and Column 14 Lines 1-8 and 35-39), allowing better control of maximum sweep angle (Column 11, Lines 61-68).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the pre-object collimator, and method for its use, of Toth et al. in the apparatus and method of Brunnett to improve control of maximum angle sweep,

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allowing for less wasteful and harmful irradiation of patient, as taught by Toth et al.

(Column 11 Lines 55-68, and Column 12 Lines 11-16).

Claims 10 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brunnett, modified by Gordon, as applied to Claims 9 and 21 above, and in further view of U.S. Patent to Toth et al. (USP# 5,224,136).

With respect to Claims 10 and 22, Brunnett, as modified by Gordon, teaches the elements of Claims 9 and 21, but does not teach a method or apparatus wherein controlling a wobble of the source focal spot comprises moving a pre-object collimator.

Toth teaches a method and apparatus wherein controlling a wobble of the source (10) focal spot (26) comprises moving a pre-object collimator (38, Column 13 Lines 29-45, and Column 14 Lines 1-8 and 35-39), allowing better control of maximum sweep angle (Column 11, Lines 61-68).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the pre-object collimator, and method for its use, of Toth et al. in the apparatus and method of Brunnett, as modified by Gordon, to improve control of maximum angle sweep, allowing for less wasteful and harmful irradiation of patient, as taught by Toth et al. (Column 11 Lines 55-68, and Column 12 Lines 11-16).

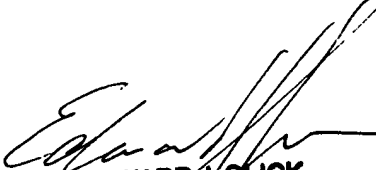
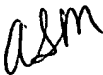
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anastasia Midkiff whose telephone number is 571-272-5053. The examiner can normally be reached on M-F 7-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on 571-272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ASM
12/28/05


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SUPERVISORY PATENT EXAMINER